

Appendix A: Overview of the Information Pieces used in the Class Study

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Interactive web interface featuring 10 clickable information pieces

You have 15 minutes to review this information. **Do not advance to the next page until you have been instructed to do so.**

Click on the labels to review the pieces of information.



Effectuation of Information

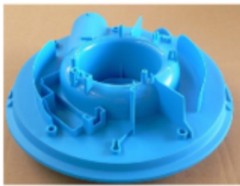
Effectual

Resources Available

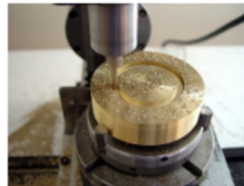
Below is information about prototyping resources available for use in the milk frother project.

Our company currently has access and routinely utilizes plastic injection molding manufacturing processes to manufacture our products. This process melts plastic pellets into a pre-determined shape as specified by a custom mold. Intricate shapes and patterns can be produced by this process, but the cost of producing a mold can be high, so large volumes of the manufactured product is important for maintaining cost efficiency.

In addition, our company routinely uses machining processes to form metal parts. The forming is done by removing extra materials from a work-piece slowly through a trimming process. This process can produce highly accurate pieces but accuracy is limited and parts need to be machined piece by piece, increasing the cost of this process.



Plastic Injection Molding



Metal Machining

Causal

Below is information about an important trend in coffee consumption.

Craft coffee brewers are trending as a niche opportunity in the U.S. coffee market, with coffee consumers now using methods at home, like French press, pour over, and siphons. And that's causing some confusion in the industry, since these craft-coffee consumers differ from traditional coffee drinkers in some important ways. The following are important trends about craft-coffee consumers:

- Millennials are twice as likely as their Boomer parents to use methods at home.
- 1 in 4 crafted coffee brewers are occasional coffee drinkers.
- The at-home craft movement is being led by foodies.
- 25% say “food is my passion and essential part of my lifestyle and identity” compared to only 14% of automatic brewers.
- 63% of crafted coffee brewers seek out and try new foods.
- 80% of crafted coffee consumers are more likely to prefer locally owned/ independent restaurants.
- 3 in 10 crafted coffee consumers never eat at fast food establishments.



Source of information

External

Online Search

Below is information you collected, after doing an online search, for the milk frother project.

You went online and did some online research about milk frothers to learn more about the subject. From your online search, you learned the following:

Basic function of milk frothers:

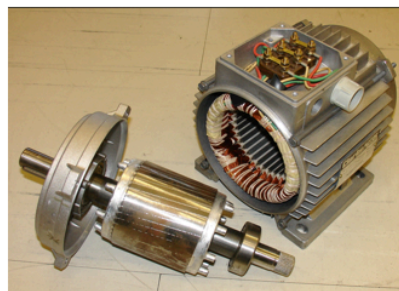
All milk frothers do the same thing, they rapidly move the content of the milk to introduce as much air as possible into the milk. This process causes small bubbles to be formed in the milk. This is called microfoam and is used with coffee drinks to thicken the texture of the beverage.

Motors

Many of the milk frothers rely on electronic motors to produce rapid motion needed to froth milk. These Electronic motors can be found in many household appliances like washing machines, air conditioners, blenders, kitchen mixers, and even refrigerators. In all these products, the electronic motor is not the most expensive part but it is considered a critical component in the design. Therefore, it is important that manufacturers of kitchen appliances rely on companies that to supply high quality motors to ensure the robustness of their products.



Rapid motion



Electronic motor

Internal

Below is information from prior kitchen appliances that your company has previously developed

Through your experience at this company, you have worked with hand-held appliances for use in home kitchens. These small electrical appliances are powered by wall outlets or batteries and are used to beat ingredients such as eggs, flour, butter and, into a mixture or emulsion, for baking and cooking. These mixers are held by the user and have 2 beaters that agitate the ingredients. These appliances have typical features:

- Several speed settings for the user to choose from
- Ergonomic grip
- Cable storage system
- Electronic display

Having knowledge about kitchen appliances and how they function, has given about how kitchen devices work and what the factors shorten the lifecycle of these devices. Common factors that lead to device failure include:

- Not using the device for its intended use
- Overheating of the motor
- Rust and mold on the interior

Generality of information

Cross-Cutting

Below is information you have gathered about current kitchen design

Milk frothers are intended for use in the kitchen where it can be used to froth milk for coffee drinks. Because of its context of use, milk frothers can be influenced by the design aesthetic and features of current kitchen design.

New trends in kitchen design heavily utilize white and black colors. The new trend focuses on a high-tech clean look where kitchen appliances have touch screen control panels, and are often smart connected or controlled from smartphones. Another trend in kitchen design is the vintage look and feel. Companies like Big chill are providing retro designs for customers that are willing adopt this kind of design aesthetic. Other design trends include industrial designs that embody a heavy-duty and rustic aesthetic.

Modern kitchen appliances are also equipped with features for making them more useful and efficient. Some kitchen appliances like coffee machines and ovens can be set up to finish specific tasks at specific times of the day. Gray brushed coating can prevent fingerprint stains from showing on appliance surfaces. Bluetooth technology can be utilized to allow communication between different kitchen appliances to enable an optimized task coordination between Bluetooth enabled kitchen appliances.



Vintage looking kitchen



New white and black kitchen



Touch screen control panel

Domain specific

Below is relevant information you have obtained from you field research on milk frothers

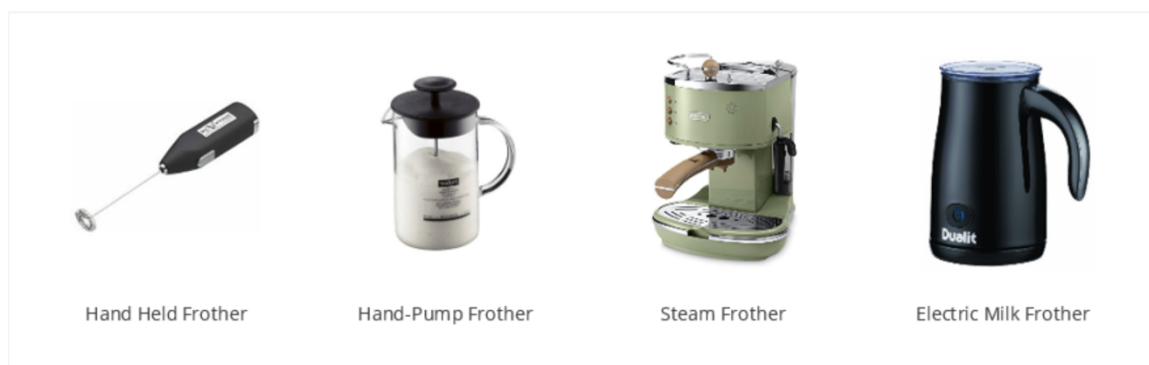
There are several types of milk frothers on the market today, some with their own unique functions. Each type of frother will have different capabilities of frothing milk and come at different price points.

Hand held Frothers are battery operated and has a whisk at the end of a wand for frothing milk. They are the most affordable type of frother, and the perfect choice if you are not frothing large batches of milk. However, they take a longer time to froth milk and do not come with a heating element.

Hand-pump frothers comprise of a stainless steel or glass pitcher, a mesh screen attached to a plunger handle and plastic or rubber rim to prevent milk from spilling. You are required to manually pump the milk in order to get it frothed, and it does not come with a heating element.

A steam frother works by steaming and frothing milk simultaneously. This feature is normally produced by steam wand attached to an espresso machine. This type of frother more accurately produces microfoam for coffee drinks, but is expensive since it requires the purchase of an espresso machine and practice is required to produce high quality frothed milk.

Electric milk frothers are small electronic devices resembling an electric kettle or small blender. The electric milk frother normally comes equipped with a jug to pour the milk in, a base, a motorized cover and a wand extended from cover with a whisk on end. Some machines have a motorized base and the whisk is placed inside the jug. They froth and steam milk at the push of a button, the machine will automatically shut off when the milk is at desired temperature. Electric frothers tend be noisy, slow at frothing milk, and expensive.



Abstraction of information

Abstract

Below is information you have obtained from your company's brand manager

Your company has recently made a strategic decision to focus the company's aesthetic on vintage and nostalgic design. Specifically, this includes product designs mimic design trends of the 1940s -1960s. In order to build this brand image, the final designed product should blend in such retro-looking kitchens without destroying the overall look and feel that the company is striving to maintain.

Below are example products with vintage designs:



Concrete

Below is information about the process of frothing milk

The process of frothing milk requires precision and patience. Depending on how skilled a person is in using a milk frother, the result may vary. Below you will find some points that can help in making a good frothed milk.

-Milk proteins usually start to break down at 170°F. The froth tends to be better when the temperature of the milk does not exceed 155°F with an acceptable range of 150° to 155°. The reason for that is because the proteins in the milk is what typically stabilizes the entrapped air and forms bubbles, creating a superb froth.

-Different milk types have varying burning points. For example, Soy milk will burn before whole milk because it lacks fat. That is why practicing with different heat levels will yield better results for your favorite milk type.

-Pre-heating the serving cup will allow the frothed beverage to maintain a desired temperature for frothed milk.

- The key to building good froth is by using cold milk. Milk should be taken out from the refrigerator directly to the milk frothing device, in order to provide more time for frothing the milk.



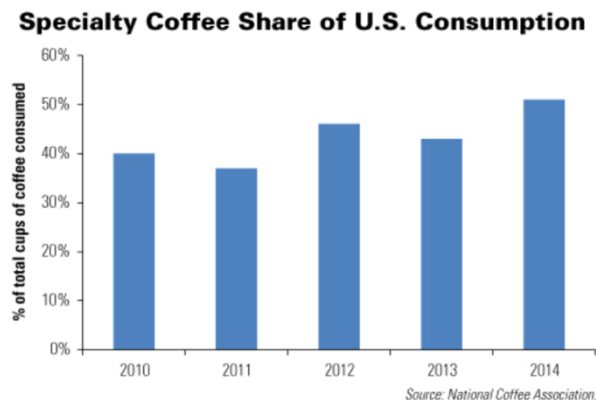
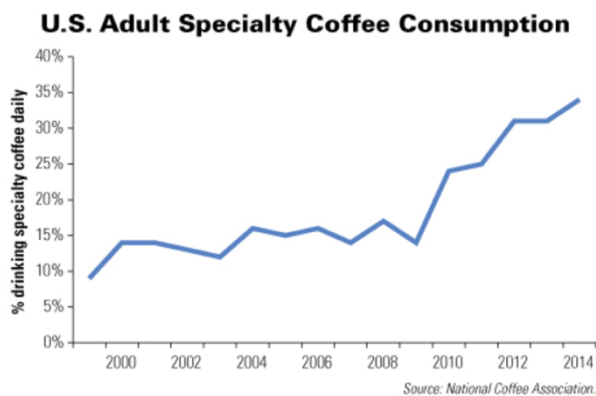
Representation of information

Asynchronous

Below is an email you have received from your teammate working on the milk frother project.

Team,

I'm forwarding some relevant information that I found while searching for information about our potential milk frother market. As we all know, coffee consumption is increasing steadily in the US, with 59% of U.S. adults drinking coffee daily! What's interesting for us, is that one of every two cups of coffee consumed in the U.S. is considered "specialty", that is, those fancy drinks like lattes, cappuccinos, etc. People are drinking more and more specialty coffee with 34% of adults drinking specialty coffee every day, up from 24% in 2010. I've attached the data that I'm talking about below. I got it from this website: <https://www.bbh.com/en-us/insights/the-continued-rise-of-premium-coffee-in-the-u-s---will-it-de-commoditize-coffee-/10966>.



Synchronous

Below is a transcript of a meeting you and your teammates attended

Joe: So, I wanted to show you all what microfoam was, so we all can see what's good and bad.

Suzie: That's the end result of using the milk frother right?

Dave: I thought it was called frothed milk-

Joe: Yeah, no, it's called microfoam, technically, since it's a little different from regular foam, which is something we don't want.

Suzie: Ok ok, so this bowl has much less foam and that-

Joe: Yes, so I have 2 bowls and in this one, I made microfoam, and in that one, I have over frothed it and made big bubbles.

Dave: So, we want microfoam? That's what I typically see in lattes and stuff...

Joe: Yes, microfoam is used in most of the "specialty" coffee drinks like lattes, cappuccinos, macchiatos, even some hot chocolate!

Suzie: Yum!

Joe: So, you actually need 2 processes to make microfoam. You need small, tiny, bubbles to form in the milk, and then you also need to heat the milk. When these two things happen slowly, the milk becomes this smooth, rich, and almost sweet liquid- you can't see the bubbles in there because it's so small.

Dave: Oh yes! I see that now (tipping bowl back and forth).

Suzie: So, what happens if the bubbles are too big? It just tastes bad?

Joe: Yep, it's not as desirable to have these big bubbles you see in this bowl. The milk becomes less sweet, tastes a little weird, and it doesn't really look good in a drink anyway. So the milk frother needs to be able to create the small bubbles we see in the microfoam.

